

Sleep and Start Times Committee

Report to the Board of Education on Committee Findings to
Support Decision-Making Related to Adjustment of School Start
Times

June 2019

Abstract

The Sleep and Start Times work group reviewed research and community feedback to determine the impacts of different start times for students.

They found sleep research showed, for elementary-age children, start times do not affect sleep. However, teenagers have different sleep patterns, and, while the research is limited, there is evidence that moving start times might reduce teens' sleepiness, car accidents, truancy and depression. The research results about impacts on academic achievement were inconclusive.

They also found changing start times had several different impacts on student and family schedules, including changing child care needs, students waiting for buses in the dark, students arriving home as late as 5 p.m., limiting after-school and community activities, missing class time, riding buses during rush hour, and limiting Professional Studies opportunities.

Results of surveys indicate that both staff and guardians highly value increasing adolescent sleep, and a slight majority of both groups favor changing high school start times to later in the morning. Differences in survey responses were much greater for socioeconomic status and ethnicity than for grade span. Guardians of students who are eligible for free or reduced-price lunch were more likely to affirm the importance of findings related to student safety early in the morning or later in the evening.

Executive Summary

A group of parents, teachers, and administrators identified the impacts of different school start times for students at different ages. Here is a summary of this Sleep and Start Times Work Group's findings:

Sleep research:

- Elementary students' sleep time and related outcomes do not appear to be affected much by different start times.
- Teens have different circadian rhythms than younger children or adults. As a result, it is difficult for them to fall asleep early and wake up early.
- Most teens are not getting the recommended amount of sleep.
- There are significant limitations in the research regarding sleep and start times.
- For teens, later start times are associated with longer total sleep time.
- Some evidence shows moving high school and middle school start times later may result in:
 - Some reduction in students' sleepiness
 - Some reduction in morning automobile accidents involving students
 - Some reduction in truancy
 - Some reduction in symptoms of depression
- Results are inconclusive for outcomes related to academic achievement.

Logistical impacts of moving start times to earlier or later:

- In many scenarios, families' child care needs would likely change.
- For elementary and middle school students, very early start times would mean bus riders and walkers would be outside in the dark and in colder temperatures.
- Later start times would mean elementary and middle school students who live at the end of bus routes might be dropped off after 5 p.m. Other impacts for students in these grade levels with later start times include limiting after-school activities and preventing bus riders waiting in the dark in the mornings.
- Later start times would result in students involved in after-school activities getting home after dark during daylight savings time.
- Later start times would result in limited after-school activities.
- Later start times would result in bus routes running during afternoon rush hour.
- For high school students with later start times, impacts include:
 - Student-athletes and coaches in many sports would miss additional class time to attend sporting events scheduled outside the traditional class schedule.
 - Student access to outside community activities like dance or athletics would decrease.
 - Lights would need to be installed on practice and playing fields.
 - Student access to Professional Studies opportunities would be limited.
 - Students who rely on individual transportation services would not be able to use taxis after 5 p.m..
 - Facility access for community practices and activities would be reduced.
 - Some high school practices and activities could occur before school.

Results of surveys indicate that both staff and guardians highly value increasing adolescent sleep. As a result, a slight majority of both groups favor changing high school start times to later in the morning. Differences in survey responses were much greater for socioeconomic status and ethnicity than for grade span. One consistent finding is guardians of students who are eligible for free or reduced-price lunch were more likely to affirm the importance of findings related to student safety early in the morning or later in the evening.

Process

Background

Based on community feedback regarding a proposal to change school start times, the Park Hill School District decided to research the impact of changing the order of school start times. One specific consideration to be examined was the benefits and drawbacks of moving high school start times later in the morning. A committee of teachers, parents, and administrators was formed to examine these issues.

Charter

The committee was asked to respond to the following questions and report their findings to the Board-approved Bus Driver/Start Times Committee.

- How do start times affect sleep?
- How does sleep affect school?
- How do different start times affect after-school activities?
- How do different start times affect academic and co-curricular programming?
- What are important scientific and logistical considerations for start times for elementary, middle, and high school?

To the best of their ability, the committee is expected to deal only in facts, not opinions. Also, the committee will not provide judgement or value-based recommendations.

Activities

Review and summarize research to answer key questions

Identify logistical impact of various start times

Committee Facilitators

Jeff Klein, assistant superintendent for academic services

Stephanie Amaya, director of professional studies

Jasmine Briedwell, director of elementary education

Jaime Dial, director of secondary education

Committee Members

Darren Brehm, parent

Faith Brehm, parent

John Carr, administrator

Steve Chrostowski, teacher

Christina Courtney, administrator

Raycinia Ellison, parent and pediatrician

Shelly Evans, teacher

Susan Green, parent

Luann Halverstadt, administrator

Lee Heinerikson, administrator

Nell Hubacher, teacher

Gina James, parent

Brad Kincheloe, administrator

Dale Longenecker, administrator

Jessica Mayberry, parent

Eve Osborne, teacher

Abby Sanford, teacher

Casie Schmid, teacher

Elijah Shore, teacher

Adrian Singletary, administrator
 Ryan Stanley, administrator
 Alice Trager, teacher
 Amy Wiser, parent
 Tressa Wright, administrator

Process and Activities

The Sleep and Start Times Committee held three meetings to complete the work set out by the charter. Each committee member was assigned to one of four subgroups: research, elementary logistics, middle school logistics, and high school logistics. Each group used a systematic process to work through identifying and validating their findings. The research group read studies, especially meta-analyses from peer-reviewed journals. These articles were discussed during group work time, and findings were validated through multiple sources.

The logistics subgroups examined possible start times for impacts on logistics for schools, community, and families. They then gathered information and data to confirm or refute each of the impacts identified by the group, resulting in a validated set of logistics findings.

Detailed Findings

Sleep and Start Times Research Subgroup

Findings
Elementary age students are more malleable and less affected by changes in sleep and wake times. Changing start times has less effect on elementary students.
Teens have different circadian rhythms than adults. As a result, it is more difficult for them to fall asleep early than for younger students.
There are significant limitations in the evidence base re: sleep and start times.
Most studies do not conform to standards required for definitive conclusions.
Longitudinal data are absent from the field in general.
Delaying start times for high school students does not seem to change bed times.
In general, later start times are associated with longer total sleep time. Length of delay in start affects amount of sleep gained.
Few (31.6%) high school students get sufficient sleep.
Later start times are associated, in some studies, with less self-reported sleepy feelings during school.

Later start times are associated with declines in student automobile accident rates.
Later start times are associated, in a few studies, with more observed engagement in class activities. This is sometimes reported as greater alertness.
Few reliable studies show increased academic achievement (grades or test scores) based on delaying start times. At best, results are inconclusive. The practical impact of these changes on school outcomes, when observed, is generally quite small.
Later start times are associated with better attendance and less tardiness.
Sleep deprivation is associated with depressive symptoms.
Though there is minimal research on middle school, middle school students seem to respond to later start times in similar ways as compared to high school students.

Considerations:

Environmental factors including homework, after-school activities, part-time work, and increasing use of technology have significant negative impacts on sleep time.

Elementary Logistics Subgroup

If elementary schools start earlier, such as 7:30, and end at 2:30, then...

Findings	Evidence
Bus riders and walkers safety impacted when out earlier in the dark and cold temperatures (assuming up to 45 minute bus ride).	Sunrise Times (US Naval Observatory USNO) Sunset Times (US Naval Observatory USNO)
Staff members who share two buildings will be impacted.	Human Resources work with staff members who currently share buildings with different start times.

If elementary schools start earlier such as 8:00 and end at 3:00 then...

Findings	Evidence
Bus pick up time will be in the dark during daylight savings time (assuming up to 45 minute bus ride).	Sunrise Times (US Naval Observatory USNO)

If elementary schools start at the same time such as 8:40 and end at 3:40 then...

Findings	Evidence
No impact	

If elementary schools start later such as 9:00 and end at 4:00 then...

Findings	Evidence
No impact	

If elementary schools start later such as 9:30 and end at 4:30 then...

Findings	Evidence
Buses will drop off students after 5:00.	An average bus ride is 20-30 minutes.

Considerations:

7:30-2:30

- We would need to make considerations for morning programs.
- Teachers may not be able to get to work earlier.
- It is possible morning childcare needs would decrease and afternoon childcare needs would increase. (Currently 16-18% of students in Adventure Club)
- There would be longer wait times between meals.
- Students might not eat breakfast at home.
- Students may get less sleep.
- Potential for students to be home alone for longer hours.
- Families that have children at multiple levels will be impacted.
- Possible increase in cost of child care.
- Special education busing will need to change pick up and drop off times.

8:00-3:00

- Special education busing will need to change pick up and drop off times.

8:40-3:40

- Same time, no change impacts to consider

9:00-4:00

- After school student opportunities will be impacted.
- Cost of Adventure Club will change based on the number of hours students spend in Adventure Club.
- Enrollment could decrease or increase.
- More children may need childcare.
- Special education busing will need to change pick up and drop off times.

9:30-4:30

- Students may not eat breakfast until 9:30.
- Recess in the fall and spring will be hot. Recess in the winter will be warmer.
- Outside activities and sports could be impacted.
- Special education busing will need to change pick up and drop off times.
- Potential for students to be home alone for longer hours.

Middle School Logistics Subgroup

If middle schools start around the same time, such as 7:30, and end at 2:30, then...

Findings	Evidence
During daylight savings time, students will be at the bus stop in the dark in the mornings (assuming up to 45 minute bus ride).	Sunrise Times (US Naval Observatory USNO)
Prime Time offered times remain the same as they are now.	
Not much change to current status quo of programming and systems.	

If middle schools start later, such as 8:00 and end at 3:00, then...

Findings	Evidence
Students will miss class time because they will leave early to get to sporting events due to a traditional schedule in other districts.	Time lost is dependent on sport. Taking all sports into account, the total amount of time missed is 28.75 hours.
Coaches who teach will miss class time because they will leave early to get to sporting events. This impacts all students in classes taught by coaches.	Time lost is dependent on sport. Taking all sports into account, the total amount of time missed is 28.75 hours.

If middle schools start later, such as 8:30 and end at 3:30, then...

Findings	Evidence
Students will get home after dark during daylight savings time.	This would impact only students who are involved in an after school activity and/or intramural. <ul style="list-style-type: none"> ● Girls Basketball: 30 ● Boys Basketball: 30 ● Intramural: unknown number of students
Students will miss class time because they will leave early to get to sporting events.	Time lost is dependent on sport. Taking all sports into account, the total amount of time missed is 84 hours.
Coaches who teach will miss class time because they will leave early to get to sporting events. This impacts all students in classes taught by coaches.	Time lost is dependent on sport. Taking all sports into account, the total amount of time missed is 84 hours.

If middle schools start later, such as 9:00 and end at 4:00, then...

Findings	Evidence
Allows for enrichment or intramurals before school.	
Allows for morning practice before school.	
Students will not be in the dark when going to school in the morning all year (assuming up to 45 minute bus ride).	Sunrise Times (US Naval Observatory USNO)
Students will miss class time because they will leave early to get to sporting events.	Time lost is dependent on sport. Taking all sports into account, the total amount of time missed is 116.5 hours.
Coaches who teach will miss class time because they will leave early to get to sporting events. This impacts all of their students in the class(es) they have at the end of the day.	Time lost is dependent on sport. Taking all sports into account, the total amount of time missed is 116.5 hours.

If middle schools start later, such as 9:30 and end at 4:30, then...

Findings	Evidence
Bus routes will run during afternoon rush hour.	
Students will not be in the dark when going to school in the morning all year (assuming up to 45 minute bus ride).	Sunrise Times (US Naval Observatory USNO)
Students will be coming home in the dark during daylight savings time (assuming up to 45 minute bus ride).	Sunrise Times (US Naval Observatory USNO)
Students will miss class time because they will leave early to get to sporting events.	Time lost is dependent on sport. Taking all sports into account, the total amount of time missed is 159.25 hours.
Coaches who teach will miss class time because they will leave early to get to sporting events. This impacts all students in classes taught by coaches.	Time lost is dependent on sport. Taking all sports into account, the total amount of time missed is 159.25 hours.

High School Logistics Subgroup

If high schools start around the same time, such as 7:30, and end at 2:30, then...

Finding	Evidence
There will be very little change to current systems, including student attendance and tardies.	Current start times are 7:30 at both high schools.
Students continue to have current program offerings within the Professional Studies umbrella.	All professional studies programs will be able to attend at this time (732 seats). See Professional Studies evidence for more detail.
Less class time is missed for athletics than later start times.	Time lost is dependent on sport. Taking all sports into account, the total amount of time missed is 334 hours.

If high schools start later, such as 8:00 and end at 3:00, then...

Finding	Evidence
Student athletes will leave early for school-sponsored activities and miss instructional time.	Time lost is dependent on sport. Taking all sports into account, the total amount of time missed is 381.5 hours.

Staff who are coaches or sponsors will leave early for activities and miss instructional time, impacting all students.	Time lost is dependent on sport. Taking all sports into account, the total amount of time missed is 381.5 hours.
Impacts taxi service for homeless population because cabs will not transport students after 5pm.	This is part of the negotiated contract with Checker Cab--Checker will not transport students after 5pm due to liability. If something goes wrong, who would they contact after 5pm?
Park Hill Professional Studies impact study indicates little to no impact at 8:00 a.m. start time.	All professional studies programs will be able to attend at this time (732 seats). See Professional Studies evidence for more detail.

If high schools start later, such as 8:30 and end at 3:30, then...

Finding	Evidence
Students will leave early for school-sponsored activities, missing instructional time.	Time lost is dependent on sport. Taking all sports into account, the total amount of time missed is 446.5 hours.
Staff who are coaches or sponsors will leave early for activities and miss instructional time, impacting all students.	Time lost is dependent on sport. Taking all sports into account, the total amount of time missed is 446.5 hours.
Student access to outside activities (dance, hockey, etc.) decreases.	There is a 14% decrease in the time between the end of the school day and 9:30 p.m.
Requires the installation of lights on practice and playing fields due to practice times later in the day.	PHS: Football and Tennis courts PHHS: Soccer and Baseball ~\$150,000-\$200,000 per field
Students will have sunlight both getting on the bus and getting off the bus throughout the year (assuming up to 45 minute bus ride).	Sunrise Times (US Naval Observatory USNO) Sunset Times (US Naval Observatory USNO)

<p>Student access to Professional Studies opportunities will be limited.</p>	<ul style="list-style-type: none"> ● Aspiring Medical Professionals must be redesigned in order to offer in the morning, requiring renegotiation with St. Luke's Hospital. ● Must redesign the Aspiring Educators course ● No cab transportation for students after 5:00 p.m., which may impact ability of students to take an internship. ● Lose all afternoon seats at NCC (44 seats) ● Lose all morning seats at NCAPS (85 seats) ● Lose all afternoon seats at MCC/BTC (5 seats) ● Total loss of 184 seats
<p>This start time is out of step with other high schools in the KC metro area/KC suburban conference.</p>	<p>This is true for all KC Metro Schools except for Hickman Mills. (See start time comparison sheet.)</p> <p>Local district start time range: 7:18-8:30 a.m.</p> <ul style="list-style-type: none"> ● Median start time: 7:35 a.m. ● Mean start time: 7:37 a.m. ● Mode start time: 7:30 a.m. <p>Comparative district start time range: 7:15-8:55 a.m.</p> <ul style="list-style-type: none"> ● Median start time: 7:35 a.m. ● Mean start time: 7:45 a.m. ● Mode start time: 7:15 a.m.

If high schools start later, such as 9:00 and end at 4:00, then...

<p style="text-align: center;">Findings</p>	<p style="text-align: center;">Evidence</p>
<p>Student access to Professional Studies opportunities will be limited.</p>	<ul style="list-style-type: none"> ● Loss of all 50 morning Aspiring Medical Professional seats ● Must redesign Aspiring Educators course ● Loss of all 200 afternoon Aspiring Professional seats. ● Loss of all 196 NCC seats--cannot work within their time frames ● Potential loss of all 170 NCAPS seats ● Loss of all 26 MCC/BTC seats ● Total number of seats lost = 592

<p>May limit students who rely on taxis for transportation to participate in activities. (No students in cabs after 5:00 p.m.).</p>	<p>This is specific to students in the internship program (approximately 30) who would not be able to use a cab, and therefore, cannot participate.</p>
<p>Our high schools will not be in line with any other high school start time in the KC metro area.</p>	<p>Local district start time range: 7:18-8:30 a.m.</p> <ul style="list-style-type: none"> ● Median start time: 7:35 a.m. ● Mean start time: 7:37 a.m. ● Mode start time: 7:30 a.m. <p>Comparative district start time range: 7:15-8:55 a.m.</p> <ul style="list-style-type: none"> ● Median start time: 7:35 a.m. ● Mean start time: 7:45 a.m. ● Mode start time: 7:15 a.m.
<p>Requires the installation of lights on practice and playing fields due to practice times later in the day.</p>	<p>PHS: Football and Tennis courts PHHS: Soccer and Baseball ~\$150,000-\$200,000 per field</p>
<p>Limits gym access for community practices and activities because high school activities will take precedence.</p>	<ul style="list-style-type: none"> ● As a general practice, we do not allow community groups to use the high school gyms during the week due to already high volume of use they get from sports and clubs. ● In the elementary schools and Plaza (because of Adventure Club and Prime Time), we do not allow community groups to reserve space until after 6:00 p.m. when those programs end. ● Over the past 4 years, an average of 23% of events in our schools are community groups using our space. ● Lowest usage by the community is in June and July ● The top 10 buildings used after hours by the community with number of hours used are: <ul style="list-style-type: none"> ○ Lakeview: 664 ○ Plaza: 454 ○ Chinn: 417 ○ Prairie Point: 400 ○ Congress: 332 ○ Union Chapel: 326 ○ Hawthorn: 285 ○ Graden: 238

	<ul style="list-style-type: none"> ○ Park Hill South: 203 ○ Renner: 165
High school practices can occur before and after school.	
Students will leave early for school-sponsored activities, missing instructional time.	Time lost is dependent on sport. Taking all sports into account, the total amount of time missed is 533.5 hours.
Staff who are coaches or sponsors will leave early for activities and miss instructional time, impacting all students.	Time lost is dependent on sport. Taking all sports into account, the total amount of time missed is 533.5 hours.
Student access to outside activities (dance, hockey, etc.) decreases.	There is a 21% decrease in the time between the end of the school day and 9:30 p.m.

If high schools start later, such as 9:30 and end at 4:30, then...

Findings	Evidence
Student access to Professional Studies opportunities will be limited.	<ul style="list-style-type: none"> ● Aspiring Educators--needs complete redesign ● Aspiring Medical Professionals--loss of all 50 morning seats ● Aspiring Professionals--loss of all 200 afternoon seats ● NCC--loss of all 196 morning seats ● NCAPS: loss of all 85 morning seats
Students will leave early for activities, missing instructional time.	Time lost is dependent on sport. Taking all sports into account, the total amount of time missed is 635.5 hours.
Staff who are coaches or sponsors will leave early for activities and miss instructional time, impacting all students.	Time lost is dependent on sport. Taking all sports into account, the total amount of time missed is 635.5 hours.
Limits the use of taxis for transportation for students, particularly homeless students. (No students in cabs after 5:00 p.m.).	Contract with Checker Cab-Checker will not transport after hours due to liability.

<p>Limits gym access for community practices and activities because high school activities will take precedence.</p>	<ul style="list-style-type: none"> ● As a general practice, we do not allow community groups to use the high school gyms during the week due to already high volume of use they get from sports and clubs. ● In the elementary schools and Plaza (because of Adventure Club and Prime Time), we do not allow community groups to reserve space until after 6:00 p.m. when those programs end. ● Over the past 4 years, an average of 23% of events in our schools are community groups using our space. ● Lowest usage by the community is in June and July ● The top 10 buildings used after hours by the community with number of hours used are: <ul style="list-style-type: none"> ○ Lakeview: 664 ○ Plaza: 454 ○ Chinn: 417 ○ Prairie Point: 400 ○ Congress: 332 ○ Union Chapel: 326 ○ Hawthorn: 285 ○ Graden: 238 ○ Park Hill South: 203 ○ Renner: 165
<p>Requires the installation of lights on practice and playing fields due to practice times later in the day.</p>	<p>PHS: Football and Tennis courts PHHS: Soccer and Baseball ~\$150,000-\$200,000 per field</p>
<p>High school practices can occur before and after school.</p>	
<p>Our high schools will not be in line with any other high school start time in the KC metro area.</p>	<p>Local start time range: 7:18-8:30 a.m. Median start time: 7:35 a.m. Mean start time: 7:37 a.m. Mode start time: 7:30 a.m.</p> <p>Comparative district start time range: 7:15-8:55 a.m. Median start time: 7:35 a.m. Mean start time: 7:45 a.m. Mode start time: 7:15 a.m.</p>

Student access to outside activities (dance, hockey, etc.) decreases.	There is a 29% decrease in the time between the end of the school day and 9:30 p.m.
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Considerations:

7:30-2:30

- Students are not available for sibling childcare in the morning.
- Students will have less supervision at home in the afternoon while parents are still at work.
 - Ask parents when they will arrive home in the afternoon.
- Any tiered system will have an impact on our use of traveling teachers.
- Staff who have young children may not be able to find child care open early in the morning.
 - Ask staff who have young children how early they can drop off their child in the morning.

8:00-3:00

- Students may be left home in the morning prior to getting on the bus.
- We may need to offer both morning and afternoon Prime Time.
 - Ask parents if they would use morning Prime Time for middle school students.
- Traffic flow problems with people going to work, combined with school traffic

8:30-3:30

- Students may be left home in the morning prior to getting on the bus.
- We may need to offer both morning and afternoon Prime Time.
 - Ask parents if they would use morning Prime Time for middle school students
- Students will have safer commutes to school. (Based on article Jeff provided the team on day 1.)

9:00-4:00

- It is anticipated the number of teachers willing to do after school intramurals will be lower.
 - Could survey staff to see if they would staff the program at this time frame.
- Coaches could choose to have practice in the morning before school. This could be an equity issue for students who cannot get a ride.
- Students may be left home in the morning prior to getting on the bus.
- We may need to offer both morning and afternoon Prime Time.
 - Ask parents if they would use morning Prime Time for middle school students
- Limits access to activities outside of school.
- Limits after school employment opportunities for students.
- Students who work after school will have later hours, thus putting them home later.

9:30-4:30

- Students may be left home in the morning prior to getting on the bus.

- Coaches could choose to have practice in the morning before school. This could be an equity issue for students who cannot get a ride.
- We may need to offer both morning and afternoon Prime Time.
 - Ask parents if they would use morning Prime Time for middle school students
- Workforce issues for their own small children needing to be picked up before daycare closes.
- Limits access to activities outside of school.
- Limits after school employment opportunities for students.
- Students who work after school will have later hours, thus putting them home later.
- Students will schedule doctor appointments before or during school.

Survey Results

For complete results from the guardian survey, See appendix A. Results from the staff survey are found in appendix B.

Respondents of both the guardian survey and the staff survey represent a balance across schools as well as grade spans. However, respondents of the guardian survey are underrepresentative of students who are eligible for free or reduced-price lunch.

Results indicate both guardian and staff respondents, on average, value research results showing positive benefits of increased sleep as more important than the impact of changing start times on school programming, including academics and activities. When asked if moving high school start times later would be worth the cost of negative school program impacts for high school students, a slight majority of both guardians (61 percent) and staff (57 percent) respond “Probably” or “Definitely.” When asked if those high school changes would be worth the drawbacks for elementary and middle school students, support moving start times back decreases to 55 percent for guardians and 51 percent for staff.

The final survey question asks respondents to consider the findings of the Sleep and Start Times Work Group and rank their preferred start time order. The top three models were the same for both groups. These are:

Highest ranked:	Elementary starts first, then middle school, then high school
2nd highest:	Middle school starts first, then elementary, then high school
3rd highest:	Elementary starts first, then high school, then middle school

These rankings reflect the importance that respondents placed on moving high school start times later.

When survey results are disaggregated by grade span and socioeconomic status, some differences emerge.

Staff Survey Results with Significant Differences in Percentage Affirmative Responses by Grade Span

	Elementary Schools	Middle Schools	High Schools
For high school students with later start times, student access to Professional Studies opportunities would be limited.	39	52	43
Teens have different circadian rhythms than younger children or adults. As a result, it is difficult for them to fall asleep early and wake up early.	54	57	44
Some evidence shows that moving high school and middle school start times later may result in some reduction in students' sleepiness.	50	54	62
Some evidence shows that moving high school and middle school start times later may result in some reduction in symptoms of depression.	71	56	73
Research results on the impact of making start times later on academic achievement are mixed.	31	45	22
In many scenarios, before and after school child care needs would likely change.	52	35	30
For elementary and middle school students, later start times would mean that for some students who live at the end of bus routes, buses might drop them off after 5 p.m.	56	46	36
For elementary and middle school students, later start times would mean limiting after-school activities.	42	33	24

Staff at the elementary (54 percent) and high school (56 percent) levels favor moving high school start times later, while middle school staff (52 percent) slightly prefer not to move high school start times back. Respondents favoring later high school start times are fewer when the change is balanced with the drawbacks for elementary and middle school students. When ranking possible start time lineups, elementary staff seem to prefer starting school first. Middle school staff prefer not to start last, and there is no pattern of consensus among high school staff respondents.

Guardian Survey Results with Significant Differences in Percentage Affirmative Responses by Grade Span

	Elementary Schools	Middle Schools	High Schools
Some evidence shows that moving high school and middle school start times later may result in some reduction in students' sleepiness.	50	54	62
In many scenarios, before and after school child care needs would likely change.	52	35	30

	Elementary Schools	Middle Schools	High Schools
For elementary and middle school students, later start times would mean that for some students who live at the end of bus routes, buses might drop them off after 5 p.m.	56	46	36
For elementary and middle school students, later start times would mean limiting after-school activities.	42	33	24

Guardian Survey Results with Significant Differences in Percentage Affirmative Responses by Lunch Status

	Free Lunch Eligible	Reduced-Price Lunch	Paid Lunch
There are significant limitations in the research regarding sleep and start times.	28	38	26
For teens, later start times are associated with longer total sleep time.	51	45	56
Some evidence shows that moving high school and middle school start times later may result in some reduction in truancy.	55	38	44
Research results on the impact of making start times later on academic achievement are mixed.	30	34	22
In many scenarios, before and after school child care needs would likely change.	44	55	41
For elementary and middle school students, very early start times would mean bus riders and walkers would be outside in the dark and potentially in colder temperatures.	73	75	50
For elementary and middle school students, later start times would mean that for some students who live at the end of bus routes, buses might drop them off after 5 p.m.	47	58	48
For elementary and middle school students, later start times would mean limiting after-school activities.	31	44	35
For elementary and middle school students, later start times would prevent bus riders from waiting in the dark in the mornings.	58	47	33
For high school students with later start times, student athletes in many different sports would miss more class time because they would leave early to get to sporting events.	34	51	42

	Free Lunch Eligible	Reduced-Price Lunch	Paid Lunch
For high schools with later start times, students involved in after-school activities would get home after dark during daylight savings time.	39	29	21
For high school students with later start times, student access to outside community activities like dance or athletics would decrease.	34	38	27
For high school students with later start times, students who rely on individual transportation services would not be able to use taxis after 5 p.m. (due to taxi company rules).	35	24	21
Would the benefits of moving high school start times later be worth the drawbacks for elementary and middle school students (since their start times would have to be moved earlier)?	49	43	55
Elementary schools first, then middle schools, then high schools	39	59	52
Elementary schools first, then high schools, then middle schools	24	33	38
Middle schools first, then high schools, then elementary schools	23	12	23
High schools first, then middle schools, then elementary schools	52	47	35

Guardian Survey Results with Significant Differences in Percentage Affirmative Responses by Ethnicity

	Black	Hispanic	Multi	White
Elementary students' sleep time and related outcomes do not appear to be affected significantly by different start times.	46	29	24	32
Teens have different circadian rhythms than younger children or adults. As a result, it is difficult for them to fall asleep early and wake up early.	48	45	41	57
There are significant limitations in the research regarding sleep and start times.	38	19	25	27
For teens, later start times are associated with longer total sleep time.	49	49	41	56

	Black	Hispanic	Multi	White
Some evidence shows that moving high school and middle school start times later may result in some reduction in students' sleepiness.	49	58	40	55
Research results on the impact of making start times later on academic achievement are mixed.	37	17	20	23
For elementary and middle school students, very early start times would mean bus riders and walkers would be outside in the dark and potentially in colder temperatures.	82	63	56	50
For elementary and middle school students, later start times would mean limiting after-school activities.	58	36	36	34
For elementary and middle school students, later start times would prevent bus riders from waiting in the dark in the mornings.	60	41	32	34
For high school students with later start times, student athletes in many different sports would miss more class time because they would leave early to get to sporting events.	57	36	33	42
For high schools with later start times, coaches who teach would miss class time because they would leave early to get to sporting events.	48	29	29	36
For high schools with later start times, students involved in after-school activities would get home after dark during daylight savings time.	52	27	19	21
For high school students with later start times, after-school activities would be limited.	60	31	33	40
For high school students with later start times, student access to outside community activities like dance or athletics would decrease.	62	29	31	37
For high school students with later start times, lights would need to be installed on practice and playing fields.	52	26	35	27
For high school students with later start times, student access to Professional Studies opportunities would be limited.	65	36	31	39
For high school students with later start times, students who rely on individual transportation services would not be able to use taxis after 5 p.m. (due to taxi company rules).	54	19	21	21

For high school students with later start times, community member access for facilities for practices and activities would be reduced.	43	19	23	22
For high school students with later start times, some practices and activities could occur before school.	52	28	19	26
Would the benefits of moving high school start times later be worth the drawbacks for elementary and middle school students (since their start times would have to be moved earlier)?	41	64	51	61
Would the benefits of moving high school start times later be worth the drawbacks for high school students?	44	60	42	54

Implications

Research is clear that inadequate sleep is a problem for the majority of adolescents. Although less clear, research on moving start times later shows adolescents get more sleep with later start times. In addition, later start times are associated with some safety, health, and cognitive benefits. In many cases, these effect sizes are small, and it is not clear if the benefits of increased sleep outweigh the potential logistical consequences.

There are some challenges with making significant changes to elementary start times, but the biggest drawbacks are for secondary schools, especially high schools. Consequences include negatively impacting programming such as Professional Studies, Northland Career Center, and Northland Center for Advanced Professional Studies (NCAPS), and increasing lost instructional time for students in after-school activities. Later start times also create concerns about loss of evening family time and time for non-school activities. These challenges are most dramatic with high school start times after 8:15am.

Results of surveys indicate that both staff and guardians highly value increasing adolescent sleep. As a result, a slight majority of both groups favor changing high school start times to later in the morning. Differences in survey responses were much greater for socioeconomic status and ethnicity than for grade span. One consistent finding is guardians of students who are eligible for free or reduced-price lunch were more likely to affirm the importance of findings related to student safety early in the morning or later in the evening.

As the district addresses the bus driver shortage, it would be prudent to focus on minimizing the negative side effects of moving start times, balanced with addressing the issue of adolescent sleep.

Appendix A
Guardian Survey Results

Q1 In your opinion, how important are each of these findings?

	NOT IMPORTANT	SOMEWHAT IMPORTANT	IMPORTANT	VERY IMPORTANT	EXTREMELY IMPORTANT	TOTAL	WEIGHTED AVERAGE
Some evidence shows that moving high school and middle school start times later may result in some reduction in symptoms of depression.	2.80% 29	8.40% 87	20.08% 208	24.61% 255	44.11% 457	1,036	3.99
Most teens are not getting the recommended amount of sleep.	3.86% 40	9.64% 100	22.57% 234	23.14% 240	40.79% 423	1,037	3.87
Some evidence shows that moving high school and middle school start times later may result in some reduction in morning automobile accidents involving students.	3.76% 39	10.90% 113	24.11% 250	25.46% 264	35.78% 371	1,037	3.79
For teens, later start times are associated with longer total sleep time.	6.27% 65	12.44% 129	26.42% 274	24.01% 249	30.86% 320	1,037	3.61
Some evidence shows that moving high school and middle school start times later may result in some reduction in students' sleepiness.	5.12% 53	13.71% 142	25.39% 263	27.90% 289	27.90% 289	1,036	3.60
Teens have different circadian rhythms than younger children or adults. As a result, it is difficult for them to fall asleep early and wake up early.	6.17% 64	15.03% 156	23.99% 249	24.37% 253	30.44% 316	1,038	3.58
For elementary and middle school students, very early start times would mean bus riders and walkers would be outside in the dark and potentially in colder temperatures.	9.85% 102	16.80% 174	21.53% 223	21.33% 221	30.50% 316	1,036	3.46
Some evidence shows that moving high school and middle school start times later may result in some reduction in truancy.	10.89% 113	15.13% 157	27.94% 290	24.86% 258	21.19% 220	1,038	3.30
For elementary and middle school students, later start times would mean that for some students who live at the end of bus routes, buses might drop them off after 5 p.m.	16.23% 168	15.85% 164	19.71% 204	20.29% 210	27.92% 289	1,035	3.28

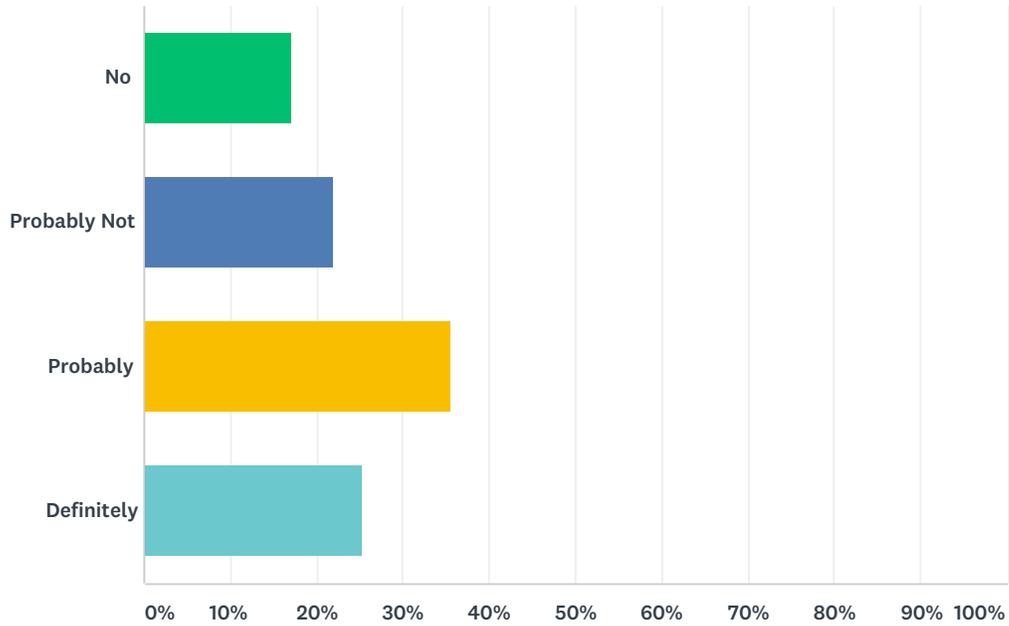
Sleep and Start Times Committee Parent Survey

For high school students with later start times, student athletes in many different sports would miss more class time because they would leave early to get to sporting events.	10.64% 110	21.47% 222	27.18% 281	18.96% 196	21.76% 225	1,034	3.20
For high school students with later start times, student access to Professional Studies opportunities would be limited.	8.88% 92	22.39% 232	31.08% 322	19.59% 203	18.05% 187	1,036	3.16
In many scenarios, before and after school child care needs would likely change.	20.17% 209	15.73% 163	20.95% 217	17.66% 183	25.48% 264	1,036	3.13
For high school students with later start times, after-school activities would be limited.	11.76% 122	22.57% 234	27.68% 287	19.58% 203	18.42% 191	1,037	3.10
For elementary and middle school students, later start times would prevent bus riders from waiting in the dark in the mornings.	15.65% 162	22.03% 228	26.38% 273	18.65% 193	17.29% 179	1,035	3.00
For high school students with later start times, student access to outside community activities like dance or athletics would decrease.	14.38% 149	23.65% 245	26.93% 279	17.95% 186	17.08% 177	1,036	3.00
For high schools with later start times, coaches who teach would miss class time because they would leave early to get to sporting events.	15.46% 160	23.86% 247	24.93% 258	17.58% 182	18.16% 188	1,035	2.99
There are significant limitations in the research regarding sleep and start times.	11.83% 122	23.08% 238	37.25% 384	13.29% 137	14.55% 150	1,031	2.96
For elementary and middle school students, later start times would mean limiting after-school activities.	17.16% 178	24.30% 252	24.20% 251	17.16% 178	17.16% 178	1,037	2.93
Elementary students' sleep time and related outcomes do not appear to be affected significantly by different start times.	17.64% 182	16.28% 168	35.66% 368	16.86% 174	13.57% 140	1,032	2.92
Research results on the impact of making start times later on academic achievement are mixed.	13.46% 139	24.49% 253	37.85% 391	13.36% 138	10.84% 112	1,033	2.84
For high school students with later start times, some practices and activities could occur before school.	19.67% 204	22.08% 229	31.34% 325	15.91% 165	10.99% 114	1,037	2.76
For high school students with later start times, lights would need to be installed on practice and playing fields.	27.32% 283	18.24% 189	27.03% 280	15.44% 160	11.97% 124	1,036	2.67

Sleep and Start Times Committee Parent Survey

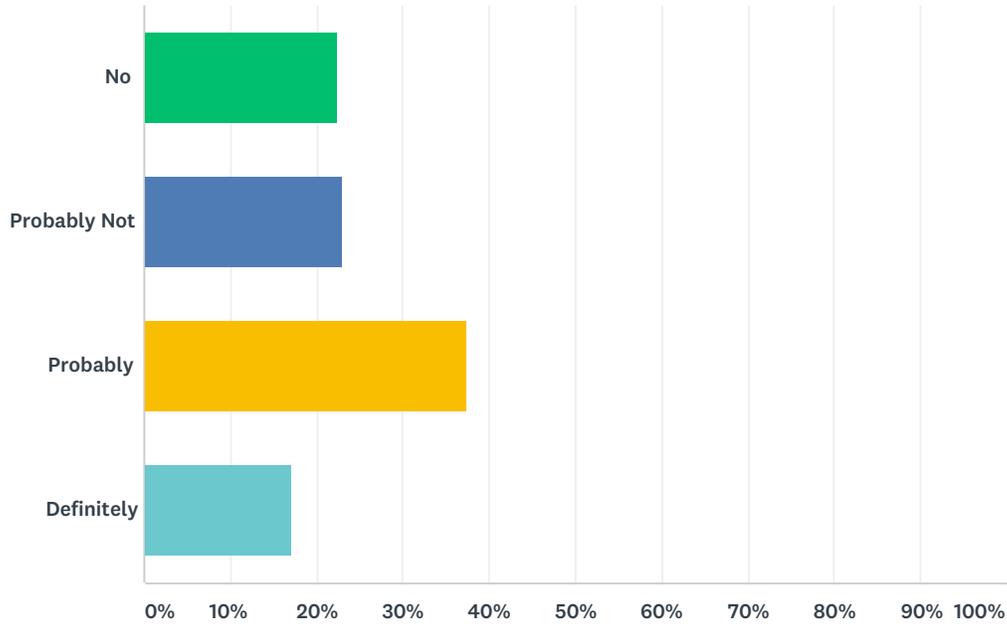
For high school students with later start times, community member access for facilities for practices and activities would be reduced.	32.43% 336	24.90% 258	21.24% 220	12.36% 128	9.07% 94	1,036	2.41
For high schools with later start times, students involved in after-school activities would get home after dark during daylight savings time.	34.52% 358	26.81% 278	15.62% 162	11.38% 118	11.67% 121	1,037	2.39
For high school students with later start times, students who rely on individual transportation services would not be able to use taxis after 5 p.m. (due to taxi company rules).	36.40% 376	22.65% 234	18.10% 187	12.20% 126	10.65% 110	1,033	2.38

Q2 Would the benefits of moving high school start times later be worth the drawbacks for high school students?



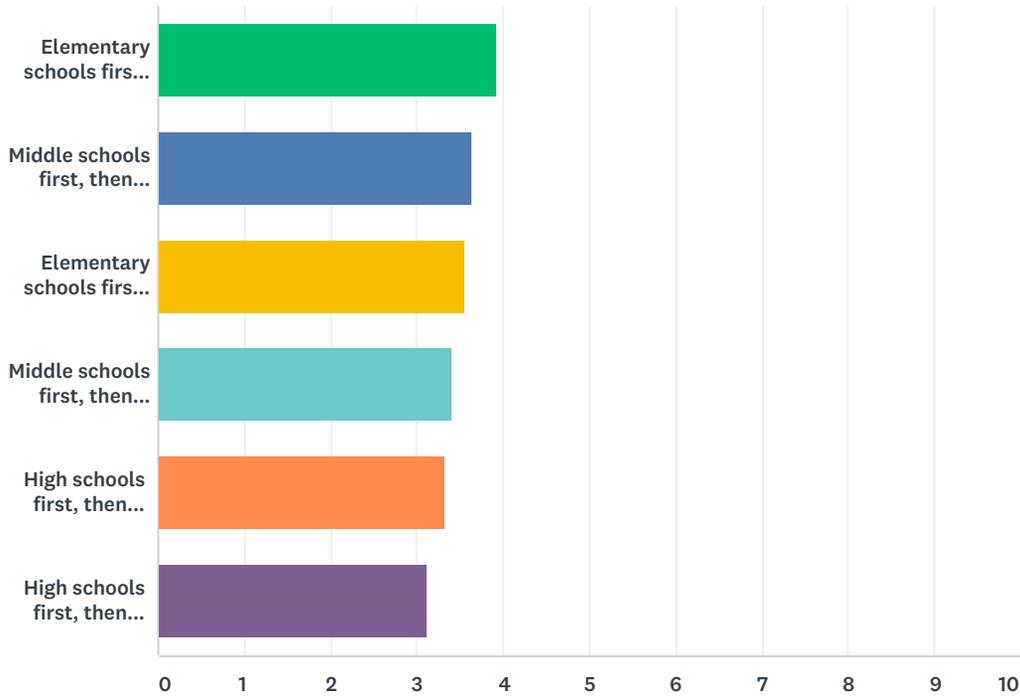
ANSWER CHOICES	RESPONSES	
No	17.17%	164
Probably Not	21.99%	210
Probably	35.60%	340
Definitely	25.24%	241
TOTAL		955

Q3 Would the benefits of moving high school start times later be worth the drawbacks for elementary and middle school students (since their start times would have to be moved earlier)?



ANSWER CHOICES	RESPONSES	
No	22.30%	213
Probably Not	23.04%	220
Probably	37.49%	358
Definitely	17.17%	164
TOTAL		955

Q4 In what order do you think the levels should start? Please rank the following with your favorite at the top.



	1	2	3	4	5	6	TOTAL	SCORE
Elementary schools first, then middle schools, then high schools	38.01% 363	12.88% 123	8.69% 83	6.39% 61	13.93% 133	20.10% 192	955	3.94
Middle schools first, then elementary schools, then high schools	10.26% 98	19.69% 188	26.49% 253	21.78% 208	12.36% 118	9.42% 90	955	3.65
Elementary schools first, then high schools, then middle schools	9.42% 90	26.07% 249	17.91% 171	17.07% 163	16.02% 153	13.51% 129	955	3.55
Middle schools first, then high schools, then elementary schools	7.85% 75	14.76% 141	22.51% 215	30.26% 289	14.55% 139	10.05% 96	955	3.41
High schools first, then middle schools, then elementary schools	28.80% 275	7.54% 72	8.06% 77	7.64% 73	18.85% 180	29.11% 278	955	3.32
High schools first, then elementary schools, then middle schools	5.65% 54	19.06% 182	16.34% 156	16.86% 161	24.29% 232	17.80% 170	955	3.12

Appendix B
Staff Survey Results

Q1 In your opinion, how important are each of these findings?

	NOT IMPORTANT	SOMEWHAT IMPORTANT	IMPORTANT	VERY IMPORTANT	EXTREMELY IMPORTANT	TOTAL	WEIGHTED AVERAGE
Some evidence shows that moving high school and middle school start times later may result in some reduction in symptoms of depression.	3.53% 14	9.32% 37	18.64% 74	26.45% 105	42.07% 167	397	3.94
Most teens are not getting the recommended amount of sleep.	3.55% 14	11.42% 45	23.86% 94	24.87% 98	36.29% 143	394	3.79
Some evidence shows that moving high school and middle school start times later may result in some reduction in morning automobile accidents involving students.	3.78% 15	11.34% 45	24.69% 98	27.96% 111	32.24% 128	397	3.74
Some evidence shows that moving high school and middle school start times later may result in some reduction in students' sleepiness.	6.06% 24	12.63% 50	25.76% 102	27.02% 107	28.54% 113	396	3.59
For teens, later start times are associated with longer total sleep time.	5.30% 21	14.14% 56	28.54% 113	25.76% 102	26.26% 104	396	3.54
Teens have different circadian rhythms than younger children or adults. As a result, it is difficult for them to fall asleep early and wake up early.	5.32% 21	14.43% 57	28.61% 113	25.32% 100	26.33% 104	395	3.53
Some evidence shows that moving high school and middle school start times later may result in some reduction in truancy.	6.08% 24	16.20% 64	25.32% 100	27.34% 108	25.06% 99	395	3.49
For elementary and middle school students, later start times would mean that for some students who live at the end of bus routes, buses might drop them off after 5 p.m.	10.86% 43	14.90% 59	21.72% 86	21.21% 84	31.31% 124	396	3.47
For elementary and middle school students, very early start times would mean bus riders and walkers would be outside in the dark and potentially in colder temperatures.	9.07% 36	18.39% 73	24.94% 99	24.69% 98	22.92% 91	397	3.34
In many scenarios, before and after school child care needs would likely change.	12.91% 51	18.73% 74	21.52% 85	20.76% 82	26.08% 103	395	3.28

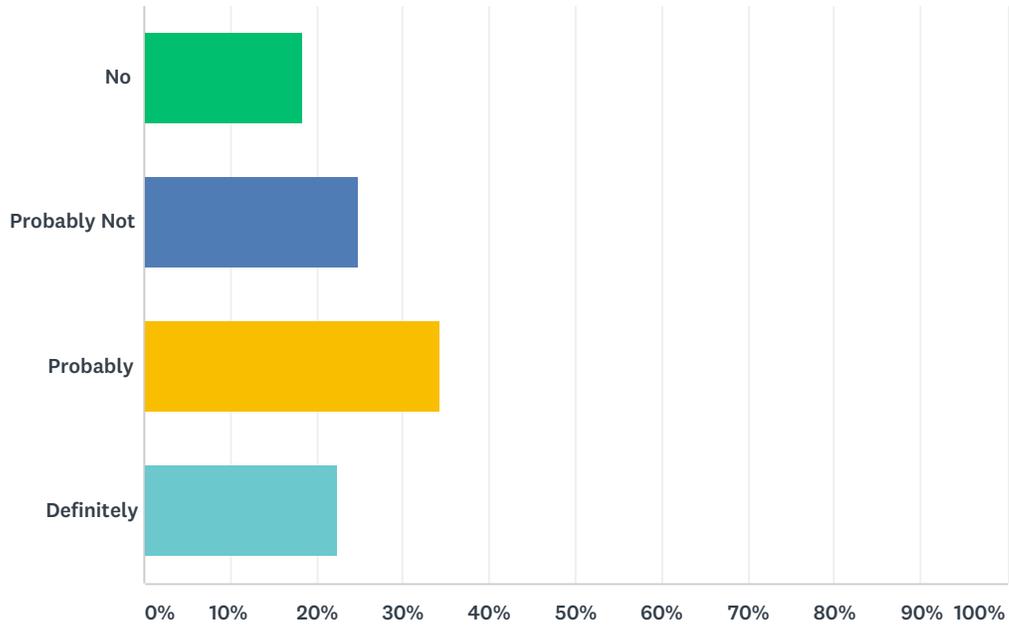
Sleep and Start Times Committee Staff Survey

For high school students with later start times, student athletes in many different sports would miss more class time because they would leave early to get to sporting events.	10.83% 43	20.15% 80	22.67% 90	25.94% 103	20.40% 81	397	3.25
For high school students with later start times, student access to Professional Studies opportunities would be limited.	9.09% 36	19.95% 79	28.54% 113	23.74% 94	18.69% 74	396	3.23
For high school students with later start times, after-school activities would be limited.	10.83% 43	24.43% 97	20.65% 82	24.94% 99	19.14% 76	397	3.17
Elementary students' sleep time and related outcomes do not appear to be affected significantly by different start times.	12.15% 48	18.23% 72	32.66% 129	19.24% 76	17.72% 70	395	3.12
There are significant limitations in the research regarding sleep and start times.	9.14% 36	20.56% 81	36.04% 142	17.26% 68	17.01% 67	394	3.12
For elementary and middle school students, later start times would prevent bus riders from waiting in the dark in the mornings.	12.63% 50	23.23% 92	24.49% 97	22.22% 88	17.42% 69	396	3.09
For high schools with later start times, coaches who teach would miss class time because they would leave early to get to sporting events.	14.65% 58	21.46% 85	23.23% 92	22.22% 88	18.43% 73	396	3.08
For high school students with later start times, student access to outside community activities like dance or athletics would decrease.	15.19% 60	23.29% 92	23.04% 91	22.28% 88	16.20% 64	395	3.01
For elementary and middle school students, later start times would mean limiting after-school activities.	11.59% 46	26.95% 107	27.71% 110	18.64% 74	15.11% 60	397	2.99
Research results on the impact of making start times later on academic achievement are mixed.	11.59% 46	19.40% 77	39.55% 157	18.14% 72	11.34% 45	397	2.98
For high school students with later start times, some practices and activities could occur before school.	18.18% 72	20.45% 81	30.05% 119	19.44% 77	11.87% 47	396	2.86
For high school students with later start times, students who rely on individual transportation services would not be able to use taxis after 5 p.m. (due to taxi company rules).	18.99% 75	25.06% 99	24.05% 95	17.22% 68	14.68% 58	395	2.84

Sleep and Start Times Committee Staff Survey

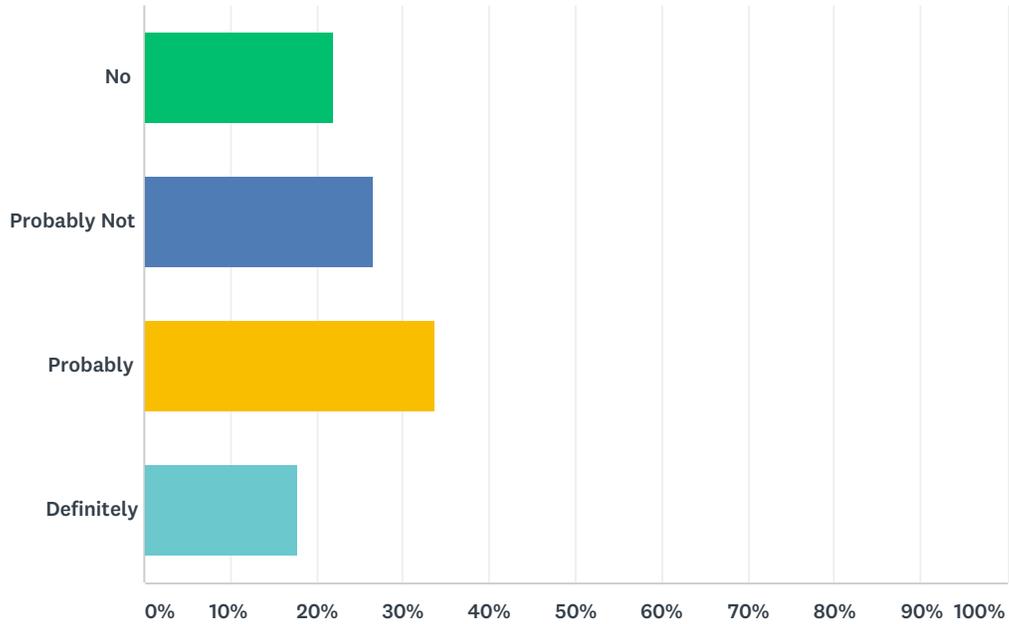
For high school students with later start times, lights would need to be installed on practice and playing fields.	25.32% 100	23.80% 94	24.30% 96	13.92% 55	12.66% 50	395	2.65
For high schools with later start times, students involved in after-school activities would get home after dark during daylight savings time.	33.00% 131	25.19% 100	19.65% 78	13.35% 53	8.82% 35	397	2.40
For high school students with later start times, community member access for facilities for practices and activities would be reduced.	31.04% 122	27.23% 107	22.14% 87	12.21% 48	7.38% 29	393	2.38

Q2 Would the benefits of moving high school start times later be worth the drawbacks for high school students?



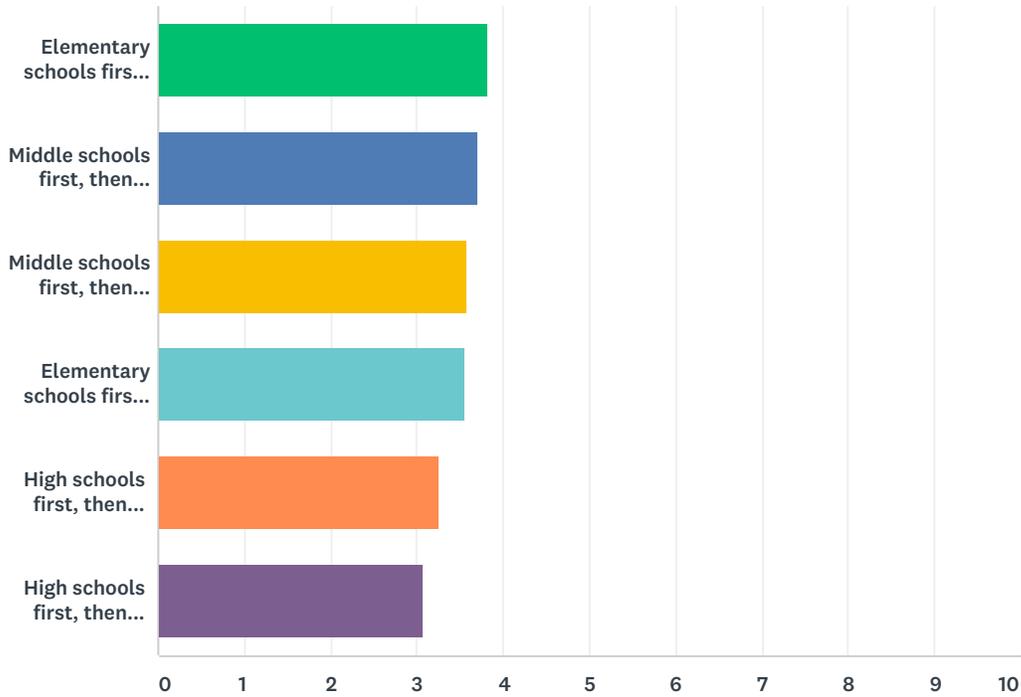
ANSWER CHOICES	RESPONSES	
No	18.40%	69
Probably Not	24.80%	93
Probably	34.40%	129
Definitely	22.40%	84
TOTAL		375

Q3 Would the benefits of moving high school start times later be worth the drawbacks for elementary and middle school students (since their start times would have to move earlier)?



ANSWER CHOICES	RESPONSES	
No	21.87%	82
Probably Not	26.67%	100
Probably	33.60%	126
Definitely	17.87%	67
TOTAL		375

Q4 In what order do you think the levels should start? Please rank the following with your favorite at the top.



	1	2	3	4	5	6	TOTAL	SCORE
Elementary schools first, then middle schools, then high schools	33.07% 124	14.67% 55	8.27% 31	8.80% 33	16.00% 60	19.20% 72	375	3.82
Middle schools first, then elementary schools, then high schools	13.07% 49	18.40% 69	24.80% 93	24.00% 90	8.53% 32	11.20% 42	375	3.70
Middle schools first, then high schools, then elementary schools	10.40% 39	17.60% 66	25.87% 97	22.93% 86	12.53% 47	10.67% 40	375	3.58
Elementary schools first, then high schools, then middle schools	12.53% 47	22.13% 83	15.73% 59	19.73% 74	17.07% 64	12.80% 48	375	3.55
High schools first, then middle schools, then elementary schools	25.87% 97	8.27% 31	10.40% 39	8.27% 31	17.33% 65	29.87% 112	375	3.27
High schools first, then elementary schools, then middle schools	5.07% 19	18.93% 71	14.93% 56	16.27% 61	28.53% 107	16.27% 61	375	3.07